

use is particularly applicable in noncontaminating environments, since by proper choice of tapes and adhesives neither one will be damaged during application and removal.

Shown in FIG. 3 is a second method of uniting the longitudinal edges of the tube 16 formed by the unrolled preformed ribbon 10. This method comprises the forming of a plurality of alternately oriented serrations 22 along the longitudinal edges of the ribbon so that during unrolling the serrations will automatically interlock. To facilitate the interlocking the serrations 22 may be tapered, each having a rounded extremity, and are separated by a notch of sufficient width to receive and secure the adjacent serration. If desired, rather than constructing the serrations as shown in FIG. 3, they may be constructed similar to a conventional zipper so that a shoe or guide (not shown) which may be passed over them for interdigitation.

A third method of uniting the abutting longitudinal edge is shown in FIG. 4 which illustrates a second embodiment of the present invention. This method consists of unrolling a first preformed ribbon 24 and a second preformed ribbon 25 of slightly smaller diameter than the first ribbon 24 in such a manner that the tube resulting from the second ribbon 25 is enveloped or circumscribed by and engages the tube resulting from the first ribbon 24 with a longitudinal seam 26 of one substantially diagonally opposite from a seam of the other 28. If a layer of a conventional contact adhesive or bonding material 30 such as rubber base contact cement is applied to either of the mutually engaging surfaces shown here being applied to the outer surface of the tube resulting from the second ribbon 25 or the inner surface of the tube resulting from the first ribbon 24 before it is rolled for storage, when the ribbons are unrolled and assume their preformed tubular shape a bond is formed between them sufficiently strong to rigidize the resulting laminated tube against torsional stresses. If desired the material 30 could be applied to the inner surface of the tube resulting from the first ribbon 24 along the longitudinal abutting seam or edge.

Shown in FIG. 5 is a modification of the third method for uniting the longitudinal edges shown in FIG. 4 wherein an outer tube 32 includes a plurality of serrations 36 along its longitudinal edges in the same manner as described for a single tube, FIG. 3. However, in this modification the outer tube 32 also includes a plurality of perforations 37 parallel to its longitudinal edge. These perforations are so disposed that they line up with a plurality of rounded tabs 38 projecting from the adjacent interdigitating serrations of the inner tube 34. The tabs 38 alternate from the longitudinal edges and are separated by a notch 40 of sufficient width to permit the tabs to engage the perforations 37 during unrolling of the tubes 32, 34. Thus during the unrolling process the tabs 38 of the inner tube 34 interdigitate with their related notches 40 while at the same time the projections of these tabs are automatically inserted into and secured by the perforations 37. Simultaneously the serrations 36 on the tube 32 are interdigitated thus providing a tubular assembly of increased torsional strength.

In all of the figures, as well as the description thereof, no illustration or reference is made to the structure necessary for the rolling or reeling of the ribbon or ribbons or the supporting and dispensing thereof since it is considered that conventional spools, guiding structures and other structures presently known in the art will be used.

While the two embodiments of the collapsible tubular structure of the present invention have been shown and described and four methods have been illustrated for the uniting of the preformed tubular structure it will be appreciated by those skilled in the art that variations of the disclosed methods and embodiments of components as to their details and to the organization of such details may be made without departing from the spirit and scope of the present invention. Accordingly, it is intended that the foregoing disclosure and the showings made in the drawings shall be considered only as illustrative of the principles of this invention and not construed in a limiting sense.

What is claimed is:

A collapsible tubular structure comprising:

a first elongated member having a preformed circular cross section and a ratio of width to thickness of a value falling within a specific range of values enabling the member to be rolled into a compact form and then unrolled into a tubular structure having a cross section substantially similar to the preformed cross section;

a second elongated member having a preformed circular cross section of a diameter slightly less than that of the first elongated member and a ratio of width to thickness of a value falling within a specific range of values enabling the member to be rolled into a compact form and simultaneously with said first member unrolled into a tubular structure circumscribed by said first member; and

means cooperating with said first and second elongated members to provide torsional rigidity to said tubular structure, said means including a plurality of serrations along the longitudinal edges of said first member defining a plurality of tabs and a plurality of perforations spaced longitudinally along the periphery of said second member whereby the unrolling of said members causes said serrations to automatically interdigitate and said tabs to be retained by said perforations.

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